

REMARKS

This paper is being presented in response to the non-final official action dated January 27, 2003, wherein: (a) claims 1-19 are pending; (b) claims 1-4 and 6-18 have been rejected under 35 U.S.C. § 103(a) as being obvious over Delio U.S. Patent No. 5,170,358 (the "Delio patent") in view of Gebauer et al. U.S. Patent No. 4,748,554 (the "Gebauer patent"); (c) claim 5 has been rejected under § 103(a) as being unpatentable over the '358 patent in view of the '554 patent and further in view of Kato et al. U.S. Patent No. 5,719,479 (the "Kato patent"); (d) claim 19 has been rejected under § 103(a) as being obvious over the '358 patent in view of the '554 patent and further in view of Mochizuki et al. U.S. Patent No. 5,414,632 (the "Mochizuki patent"); and, (e) the drawings have been objected to under 37 C.F.R. § 1.84. Reconsideration and withdrawal of the rejections and objections are respectfully requested in view of the foregoing amendments and following remarks.

This paper also is being presented in response to a "Notice of Abandonment" dated September 9, 2003. Filed concurrently herewith is a "Petition to Revive Unintentionally Abandoned Application" pursuant to 37 C.F.R. § 1.137(b) along with payment of the associated fee under 37 C.F.R. § 1.17(m).

I. Brief Summary of the Amendments

A. Amendments to the Specification

Certain paragraphs of the application have been amended. Specifically, the paragraph beginning at page 1, line 14, has been amended to replace reference to "undesireable" in line 19 thereof with --undesirable--, and to replace reference to "reject pieces" in line 25 thereof with -- drop-out pieces --. Furthermore, the paragraph beginning at page 9, line 23, has been amended to replace reference to "cavity sinking" in lines 23 and 24 thereof with -- die sinking --. Still further, the paragraph beginning at page 10, line 30, has been amended to replace reference to "29 30" at page 11, line 7, thereof with -- 29 and 30 --. No new matter is introduced by the foregoing amendments to the specification.

B. Amendments to the Drawings

Drawing figures 1 and 2 have been amended by identifying the linear measurement system 70, and the elongated scale 51 (formerly identified in the drawing FIG. 2 by reference number 71), and the Z-main axial direction in FIG. 2. Support for the amendment is found in, for example, the specification at page 15, lines 9-31. Additionally, aesthetic amendments to the drawings have been made to address the objections set forth at pages 2 and 3 of the action. Attached hereto are two replacement sheets of drawings that include changes to FIG. 1 and FIG. 2. These replacement sheets should be substituted for

the drawing sheets filed with the application. Reconsideration and withdrawal of the objections are respectfully requested.

II. The 35 U.S.C. § 103(a) Rejection is Traversed

Claims 1-4 and 6-18 have been rejected under 35 U.S.C. § 103(a) as being obvious over Delio U.S. Patent No. 5,170,358 (the "Delio patent") in view of Gebauer et al. U.S. Patent No. 4,748,554 (the "Gebauer patent"). See pp. 3-9 of the action. Furthermore, claim 5 has been rejected under § 103(a) as being unpatentable over the '358 patent in view of the '554 patent and further in view of Kato et al. U.S. Patent No. 5,719,479 (the "Kato patent"). See p. 9 of the action. Still further, claim 19 has been rejected under § 103(a) as being obvious over the '358 patent in view of the '554 patent and further in view of Mochizuki et al. U.S. Patent No. 5,414,632 (the "Mochizuki patent"). See p. 10 of the action. A response to the obviousness rejection is set forth below.

A. Proper Basis for a § 103(a) Rejection

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the teachings of a plurality of references. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not based on the applicants' own disclosure. *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991); see also M.P.E.P. § 2143 (8th ed., rev. 1, Feb. 2003).

The examiner bears the burden of establishing a *prima facie* case of obviousness and "can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." *In re Fine*, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). To support a conclusion that a claimed combination is obvious, either (a) the references must expressly or impliedly suggest the claimed combination to one of ordinary skill in the art, or (b) the examiner must present a convincing line of reasoning as to why a person of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). It is "incumbent upon the examiner to identify wherein each and every facet of the claimed invention is disclosed in the applied reference." *Ex parte Levy*, 17 USPQ2d 1461, 1462 (Bd. Pat. App. & Inter. 1990) (citing *Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick*, 221 USPQ 481, 485 (Fed. Cir. 1984)).

B. The § 103(a) Rejections Are Traversed

The cited patents **do not** teach or suggest all of the limitations recited in the pending claims. Thus, no *prima facie* case of obviousness has been made in the instant action, and none exists based on the combination of the applied publications. Accordingly, reconsideration and withdrawal of the § 103(a) rejections are respectfully requested.

Neither the Delio patent nor the Gebauer patent discloses the features of the present invention. Specifically, neither discloses that direct and indirect position-measured values are compared and used to perform a disturbance sensing in a drive system of a numerically controlled machine tool as recited in part "c" of each of claims 1 and 12. At page 4, lines 1-3 of the action, the examiner acknowledges the lack of such a disclosure in the Delio patent. The Gebauer patent (and the other cited prior art documents) also do not disclose or suggest this manner for disturbance sensing in a drive system of a numerically controlled machine tool. More specifically, the Gebauer patent discloses the use of predefined programmed (but not indirectly measured) set values and compares these values with directly measured actual position values. Such a disclosure, however, is not comparable to the method/device of the present invention, which uses, in addition to a direct measurement system to measure an actual position of a machining part, an indirect measurement system configured to measure and determine a position of the machine part located at a location in the transmission chain. Support for the features distinguishing the pending claims over the Delio and Gebauer patents on this basis can be found in the specification at, for example, pages 4 and 10-12.

The Delio patent relates to a method of preventing chatter. Chatter is an undesirable vibration as may occur during machining when unsuitable process parameters (rotary speed, feed depth) are set or unfavorable cutting conditions exist, possibly resulting in poor surface finish (rejects), tool fracture or even damage to the machine. The Delio patent discloses to one skilled in the art to sense the chatter condition by means of vibration sensors, e.g., microphones (reference numerals 54, 56) or sensors in direct contact (column 5, lines 57-66) such as gauges, acceleration sensors, etc. (reference numerals 58, 60). The objectives set forth in the Delio patent are not similar to those of the present invention. Furthermore, the Delio patent's disclosure of measurements are different from the pending claims and the means for making the measurements are also different from the pending claims.

The Delio patent's disclosure proposes to one skilled in the art to sense the spindle rotary speed by means of a tachometer (reference numeral 14). The Delio patent's disclosure further proposes displacement sensors (column 5, line 63) for directly sensing the vibration. These vibration sensors have, of course, nothing to do with sensing the relative (or absolute) position of tool to workpiece and position control in cycling a control program.

The Gebauer patent discloses to one skilled in the art a method for monitoring diverse parameters of a machine tool. Diverse parameters are listed as coming into consideration for monitoring (column 3, lines 52-55):

..."from a given sensor or group of sensors used to sense parameters such as power, force, vibration, torque and acoustical emission"

Nowhere, however, is there a disclosure that the difference value of the actual values in the position of an axis is monitored, as recited in the pending claims. The applicants respectfully disagree with the position set forth in the action that the Gebauer patent discloses a comparison of the direct or indirect measurement. The cited passage of Gebauer (column 3, lines 16-24) relates to a usual position control in which a control program defines each desired position. An axis drive searches to attain this desired position. A means for measuring the axis position senses the actual position (axis position feedback). A difference value is formed between the set value and the actual value, and this difference value is used to form a position correction signal. Unlike the teachings of the Gebauer patent, in the present invention, the difference value of two or more actual position values (e.g., the difference between a "direct" actual value and an "indirect" actual value) is monitored.

The Kato patent discloses to one skilled in the art a method for detecting a collision in which the drive torque is monitored. Such a method is addressed in the "Background of the Invention" portion of the instant application. The Mochizuki patent relates to a method for detecting faults in a machine tool and its disclosure teaches one skilled in the art to compare (as already explained with reference to Gebauer) the difference value between actual value and the set value of the position. The Mochizuki patent's disclosure does not suggest a method based on the difference value of two actual values, but on the difference value of an actual value (encoder) and a set value (NC part program), the so-called position deviation variable. Other methods are described which, however, are irrelevant to the invention, since they are not based on position deviations.

Given shortcomings in the disclosures of the publications cited in the action, it is respectfully submitted that the claimed invention is unobvious. Accordingly, reconsideration and withdrawal of the rejections are requested.

CONCLUSION

In view of the foregoing, entry of amendments to the specification and drawings, reconsideration and withdrawal of the rejections, and allowance of all pending claims 1-19 are respectfully requested.

Should the examiner wish to discuss the foregoing, or any matter of form or procedure in an effort to advance this application to allowance, he is urged to contact the undersigned attorney.

Respectfully submitted,

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Attachment: Replacement Drawing Sheets